

A MINE IS A TERRIBLE THING TO WASTE: THE OPERATIONAL IMPLICATIONS OF BANNING ANTI- PERSONNEL LANDMINES

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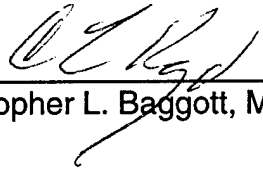
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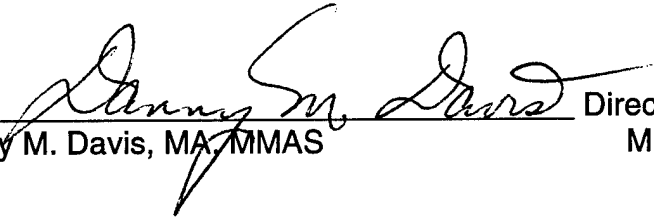
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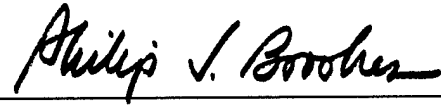
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ABSTRACT

A MINE IS A TERRIBLE THING TO WASTE: THE OPERATIONAL IMPLICATIONS OF BANNING ANTI-PERSONNEL LANDMINES by MAJ David E. Funk, USA, 53 pages.

Approximately 25,000 people each year fall victim to the estimated 110 million anti-personnel landmines (APL) scattered throughout the world. Most of the victims are non-combatants in third-world and developing nations. Because most APL are cheap to procure, long-lasting once employed, and totally indiscriminate concerning their choice of victims, the world has begun to vilify these so-called 'slow motion weapon of mass destruction.' Thus in December of 1997 did 122 nations join with Canada in signing the provisions of the Ottawa Process -- an agreement that bans universally the use, sale, and transfer of all APL. Absent from the roll of signatories was the United States. The president was willing to end US use of conventional APL, except in Korea, but was convinced by the Joint Chiefs of Staff that scatterable (self-destructing) APL were critical to the Army's countermobility doctrine and did not contribute to the humanitarian problem. Nonetheless, congress passed a unilateral law requiring a one-year moratorium on US use of all APL, except along internationally recognized national borders (read Korean DMZ). This monograph examines whether or not the US can fulfill its current warfighting contingencies without the use of APL.

The monograph begins by describing the global nature of the APL problem and examining the events that led to the Ottawa treaty and the congressional "Use Moratorium." Ban activists (including many members of congress) have gone to great lengths to show that APL do not have -- in fact have never had -- significant military utility. Therefore, the next section of this paper consists of historical analyses of the past use of APL in the PACOM (Korea), and CENTCOM (Southwest Asia/Middle East) areas of responsibility (AORs) -- the two areas that represent present-day military contingencies.

Next, the paper examines modern-day mine warfare doctrine and capabilities, and overlays them on the same two AORs to determine if APL have a valid and continuing place on the battlefield. This is the most important part of the paper, because it examines whether APL have become, as some "experts" assert, irrelevant to modern war, given the so-called "changed nature of warfare." In the end, this paper concludes that US-deployed APL do not represent a humanitarian threat, and that they do indeed remain important and valid weapons that will reduce US casualties and assist regional commanders in chief (CINCs) in accomplishing operational objectives. Perhaps surprisingly, this conclusion applies to the desert environs of Southwest Asia, as well as to the more restrictive terrain in Korea. Unfortunately, this paper concludes also that none of the above matters. The US will eventually ban APL -- probably sooner than later -- either unilaterally, or as part of an international agreement. If no viable replacement for the APL is developed in time, the operational implications are serious indeed.

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I. Introduction

Somewhere in Angola, the peaceful night air suddenly is pierced by a deafening explosion and the shrieks of a small child. A mother cries in heart-wrenching sobs at the loss of her baby. Half a world away, a United States senator begins a crusade. The international media jumps into the fray. The United States assumes, then concedes, the moral high ground. Emotions run high. Confusion is rampant. The toll of victims grows. A European princess dies in a horrible car accident. Then, an unknown American woman wins the Nobel Peace Prize. All will be well...or so it seems.

What is the collective relationship among these seemingly disparate events? It is nothing more nor less than the ubiquitous anti-personnel landmine (APL). As of today, much of the world has joined hands in a humanitarian show of international solidarity, to rid the world of this deadly scourge. A few rogue nations have locked arms in a stance of open defiance. Standing somewhere in between is the United States.

According to widely quoted statistics, approximately 25,000 people each year fall victim to the estimated 100 million APL scattered in 68 countries throughout the world.¹ The vast majority of these victims are non-combatants in third-world and developing nations. Aside from the direct human toll, there are immense, if less measurable, side effects. In many countries, APL infestation renders useless large portions of otherwise productive land. Roads cannot be traveled, fields go uncultivated, and refugees hesitate to return to their homes. Even if the estimates are inflated, the severity of this global crisis is irrefutable.

Thus in December, 1997 did much of the world complete the self-congratulatory proceedings known as the Ottawa Process by signing a treaty that bans universally the use, production, sale, and export of these so-called "slow-motion weapons of mass destruction." Conspicuously absent from the roll of signatories, however, was the United States. Predictably, the US has come under intense international and domestic pressure to conform to the provisions of the Ottawa Process. Why was the US a hold-out to the treaty? Should we have signed? Do we still need APL to fight and win our nation's wars? These questions are the focus of this paper.

The central question this paper will address is: What is the impact of banning APL on current US Army warfighting contingencies? To answer this question, it is imperative to sort through the emotion and confusion surrounding the ban and to approach the issue from a more pragmatic point of view. This paper will begin by defining what an APL is, and what the distinctions are between APL and other explosive devices, such as the anti-tank mine and the booby trap (this latter of which, ironically, is not banned by the provisions of the Ottawa Process).

Next, this paper will trace briefly the history of landmine use in order to establish the global nature of the current problem. This will lead to a discussion of the processes leading up to the Ottawa Process. There may be a tendency among the uninformed to attribute the current ban to the legacy of Princess Diana's death. While her personal campaign to end the use of landmines was well-publicized, her death did not cause the ban, any more than the assassination of Archduke Ferdinand caused the First World War. In truth, both of these unfortunate events may have served merely as catalysts (albeit,

powerful ones), to accelerate what were already inexorable processes. This section of the paper will end with an explanation of why the US, (a leading global advocate of human rights), refuses to sign the treaty as worded.

In the next section, this paper will present an historical analysis of battles and/or campaigns in Korea and the Middle East. These two regions of the world represent modern-day military contingencies for the US Army. It will therefore be of interest to note how APL have contributed to military success in these regions, or conversely, how they may have helped to avert disaster. The empirical success of APL use is not always obvious, since they do not have to detonate to achieve at least one of their purposes (counter-mobility). Nonetheless, the evidence is sufficient to arrive at an intuitive judgment on the value of APL in past warfare.

Then, this paper will jump to the present by analyzing current mine warfare doctrine and capabilities, as applied to the Pacific Command (PACOM) and Central Command (CENTCOM) areas of responsibility (AORs). This analysis is the most important part of the paper as it will determine whether APL remain a critical part of our warfighting capability in these regions, or if they are, as some people assert, industrial-age warfare relics, unnecessary and irrelevant to modern warfighting doctrine. It is necessary to analyze both AORs for two reasons. Firstly, they represent the reality of current contingency plans. Secondly, part of the reason the US has refused to sign the ban treaty is the "special" circumstance we face on the Korean peninsula (PACOM). However, this begs the question of what would happen should the tension in Korea suddenly diffuse. Would we then concede to international pressure and forswear the use

of APL? An analysis of the second military contingency -- specifically the CENTCOM AOR -- will help determine how we should answer that question.

While acknowledging the obvious moral justifications for accepting the APL ban, this paper will emphasize the military aspects of the debate. If, as some "authoritative sources" claim, the APL has demonstrated only limited military utility in the history of warfare, perhaps the US should concede the issue and cut its political losses by joining the ban. If, however, analysis reveals a valid and continuing military need for APL, then the US, as sole remaining super power and protector of much of the free world, must stand firm on the issue, at least until a viable replacement for the APL is developed.

II. Anatomy of a Ban

Before tracing the history of the current ban, it is important to define what one means when discussing APL. As the reader will see, the definition even of this seemingly simple device is subject to debate, making it no wonder the world cannot come to a common agreement. In fact, the past couple of years has seen many nations (including the US) scrambling to alter the traditional definitions in order to salvage some anti-personnel capability in their arsenals. Nonetheless, as the object of a worldwide ban, it is important to distinguish, when possible, between APL and other explosive devices, such as anti-tank (AT) mines and booby traps.

Identifying the Suspect

In general, a landmine (irrespective of its target) is, "any munition placed under, on or near the ground...to be detonated or exploded by the presence, proximity or contact

of a person or vehicle.”² The two most common families of mines are the APL and the AT mine, the major differences being the amount of pressure necessary to cause detonation, and the amount of explosive material contained in the device. Generally, humans are not heavy enough to detonate pressure-activated AT mines. As such, these mines are not banned by any current treaties.

The United Nations defines an APL as, “...a device (primarily) designed to be initiated by the presence, proximity or contact of a person.”³ The keys to the UN definition are that the APL is designed primarily to be victim-actuated, and that the victim is intended primarily to be a person. In other words, the mine detonates by the actions of its human victim, regardless of whom that victim may be. APL do not require the discriminating actions of a second party, such as aiming a weapon or pulling a trigger. Under this definition, command-detonated mines, such as the M18A1 Claymore, are known as ‘other devices,’ notwithstanding the fact that they also are targeted at humans and may be victim actuated, such as by a trip-wire.

The distinction between landmines and booby traps has always lacked clarity, partly because both devices are designed to be victim-actuated. However, the main distinction appears to be that while APL often are hidden in the ground, a booby trap employs an extra measure of subterfuge in its deployment.⁴ In other words, a booby trap may lure its victim through the use of a seemingly innocuous item, such as a child’s toy, or it may be used in conjunction with a conventional mine to defeat demining efforts. As the reader will see, this last distinction has a direct bearing on the current ban, because the

Ottawa conferees have declared that an AT mine fitted with an explosive anti-handling device (read booby trap) is legal, while using an APL to protect that same mine is illegal.

For many years, APL fell generally into one of two categories: blast or fragmentation, the difference being the kinds of injuries caused. More recently, technology has resulted in other distinctions, such as between conventional (dumb), and scatterable (so-called 'smart') mines. These latter are so named because they are designed to self-destruct or otherwise to render themselves inert after the passage of time (usually hours to weeks). Ostensibly, smart mines do not remain a hazard after a conflict, but there is disagreement even on this fact – disagreement that bears directly on the current ban.

Checking the Suspect's Record

Landmines get their very name from the sub-terrain method of warfare that led to their development. In late seventeenth-century siege warfare, an attacking force would dig trenches up to the fortress walls of a defender and emplace gunpowder charges at the base to create a breach.⁵ Later, the practice of digging tunnels (mines) up to enemy positions and detonating large explosives was perfected and continued up through the First World War.⁶ It is from the Great War that the modern application of the mine is derived. In response to the British tank, the Germans began employing command-detoned artillery shells buried beneath the surface. This soon evolved into the pressure-activated AT mine.

As with any development in warfare, there is an immediate counter-measure -- in this case, it was the simple practice of removing (breaching) the mines along the intended attack route. The Germans, realizing the power of the tank and the need to stop it, focused much of their efforts during the inter-war years developing a counter-counter measure to breaching efforts. Thus was born the APL, perfected and ready for use by the outbreak of the Second World War.⁷ The concept was simple enough. When an enemy approached an AT mine field and dismounted to attempt a breach, his soldiers were subject to the effects of APL. These new devices were unique in the history of arms development because, with few exceptions, they were intended specifically to maim, rather than to kill. As warfare had entered the industrial age of mass armies, belligerents were learning that they could impose larger strains on the enemy's logistical system by causing injuries rather than death. During the Second World War, both the Axis and the Allies employed mines by the tens of millions, not only in Europe, but also in Northern Africa.⁸

Because the use of mines was so prevalent during this conflict, the practice gained widespread acceptance as a viable means of waging war. Soon, armies discovered that APL had applications beyond the mere protection of AT mines. They served as effective barriers along dismounted avenues of approach and provided a cheap economy of force measure.⁹ Since then, APL have become a weapon of choice among many armies for several reasons. Firstly, they are cheap, costing as little as three dollars per mine. Even poor armies can buy them in bulk. Secondly, they are effective. Evidence indicates that when used properly and in sufficient numbers, they have a significant detrimental effect

on an army's mobility. Finally, APL are long-lasting. The vast preponderance of APL employed in the past fifty years are of the dumb variety and have never been removed. Mines laid during the Second World War are still causing casualties 50 years later.¹⁰

Unfortunately, the same characteristics that make APL attractive in war also make them deadly to non-combatants long after the fighting has ended. APL have one additional defining characteristic that makes them particularly ghastly, a characteristic that does not necessarily add to their military value, but that has dire consequences for the civil populace – they are totally indiscriminate. APL neither know nor care whether their victims are fighting a war or herding sheep. Thus has the APL become a favored tool for terrorist groups and insurgents to control populations. Thus also has the APL become vilified by much of the international community. As the reader will see, the move to ban APL began in earnest after the end of the Cold War, when the world became less concerned with the horrors of nuclear holocaust.

Hopping on the Ban Wagon

*"The thesis then, must be repeated: war is an act of force, and there is no logical limit to the application of that force."*¹¹

- Clausewitz

Despite the foregoing quotation from the famous Prussian war theorist, the international community has a long-standing tradition of controlling or even banning weapons deemed too inhumane or indiscriminate in their effects. Examples include the 'dum-dum' (expanding) bullet, asphyxiating gasses, and biological weapons.¹² Further, it is commonly accepted, and codified by international law, that non-combatants may not be

targeted during time of conflict. The criteria for banning a weapon has never been clear, but the logic seems rational enough. If the military utility of a weapon is disproportionately small compared to its extremely indiscriminate or inhumane nature, that weapon may be subject to a ban, or to restrictions on its employment.

Efforts to control the employment of mines began with the United Nations Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects¹³ (commonly, and more succinctly called the CCW), adopted in 1981. Protocol II of the CCW addressed specifically Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices.¹⁴ The nine articles of Protocol II were noteworthy in that they represented the first international attempt to prescribe limits on the military use of a so-called conventional weapon -- the landmine. Prior to the CCW, restrictions and bans had applied only to unconventional weapons and methods of waging war.

Nonetheless, and despite the signatures of more than 50 nations, (the US signed, but did not ratify the treaty), the CCW was viewed by many as a well-meaning, but impotent, measure. In point of fact, it was exactly that. Among the shortfalls of the CCW was that it did not apply to internal conflicts (from whence much of today's APL problem arises), but only to international ones. Also, the provisions for monitoring compliance and for post-war mine removal were ambiguous and weak. The most serious weakness, however, may have been the lack of international participation -- only 57 nations signed the treaty.¹⁵ Whether a lack of support made the treaty weak, or a weak

treaty resulted in lack of support is inconsequential. The simple fact remained that APL use (and misuse) continued unabated after the treaty's signing.

The US failed to ratify the CCW through two presidential administrations, and thus lost its international leadership role. For a decade then, and except among a few vocal humanitarian groups, the APL issue stayed on the political back burner. Senator Patrick Leahy (D-VT) changed that when he began a crusade that thrust the US back onto the moral high ground, at least for a time. In 1992, he and Representative Lane Evans (D-IL), introduced to congress the Landmine Moratorium Act, which among other things, "imposed a one-year moratorium on all US exports, sales, and transfers of (APL)."¹⁶ The timing of this bill was indeed fortuitous. The recent collapse of the Soviet Union and corresponding reduction in the threat of global war allowed the world in general, and the United States in particular, to focus on other causes. With a new military strategy based on power projection and increased participation in stability and support operations in third-world countries, the US came face-to-face with the landmine dilemma. In fact, a July 1993 State Department report began with the assertion that, "Uncleared landmines pose a significant challenge to the achievement of key US foreign policy objectives."¹⁷

In the Summer of 1993, the senate voted unanimously to extend for three years Senator Leahy's unilateral export moratorium.¹⁸ A few months later, riding a wave of international praise and encouragement, the US introduced to the UN General Assembly a resolution calling for an international moratorium on the export of APL. On 16 December 1993, the General Assembly adopted unanimously the provisions of the resolution.¹⁹ However, while the decisions of the General Assembly represent a kind of

'moral barometer' of world opinion, they are not legally binding to member states.²⁰ Not surprisingly, countries such as China and Russia, with foundering economies and a surplus of military hardware, were loathe to adhere to the moratorium. Thus, the euphoria that marked the passing of the resolution soon was overcome by the reality that APL were still available, and cheap, for those who wanted them. The crisis continued.

Nonetheless, having now received an international audience, and believing firmly that a total ban represented the only responsible solution, humanitarian groups and other activists began an all-out crusade to further their cause. The most vociferous and politically visible of these groups was the International Campaign to Ban Landmines (ICBL), consisting of more than 250 Non-Governmental Organizations (NGOs). Members of the group published books, wrote articles for newspapers and magazines, and staged rallies in an effort to win widespread popular support. This all-out media blitz resulted in two, somewhat divergent outcomes. On one hand, the pictures of maimed children, the alarming statistics, and the interviews with relief workers had the desired effect of informing the world in graphic terms just how serious the dilemma was. On the other hand, the US military began to display trepidation as they saw a move afoot to strip them of a much-needed weapon of war.

The military argument has followed a simple theme -- the irresponsible use by some nations of a weapon of war should not preclude the use of that weapon by responsible nations, especially if that weapon has a proven military value. Here indeed was the crux of the matter. In an effort to prove just such a value, the military conducted and published several reports and briefings reiterating the effectiveness of APL and the

potentially disastrous results of banning them.²¹ The responsible use of mines, the argument went, does *not* contribute to the humanitarian problem. On the contrary, such use is essential to effective warfighting, especially in such places as the demilitarized zone (DMZ) in Korea, where 37,000 Americans and their South Korean allies faced the threat of invasion from one million North Koreans. These arguments, as expressed by the Joint Chiefs of Staff to the president, succeeded in delaying temporarily any actions toward a ban. They did not, however, dissuade Senator Patrick Leahy from continuing his crusade. The military soon found itself arguing its case before congress.

The Leahy "Use Moratorium"

In February 1996, Senator Leahy introduced to congress the "Use Moratorium" as part of the FY 1996 Foreign Operations Appropriations Act. The moratorium was passed as Section 580 of Public Law 104-107. The moratorium states in part:

*For a period of one year beginning [12 February 1999], the United States shall not use antipersonnel landmines except along internationally recognized national borders or in demilitarized zones within a perimeter marked area that is monitored by military personnel...*²²

The moratorium does not make a distinction between conventional and scatterable mines, but clearly, the "national borders" exception is meant as a concession to the conventional mines placed along the DMZ in Korea. However, it has far-reaching implications for APL use in other areas of the world, where DMZs do not exist. Additionally, the moratorium in its current form prohibits the Army's non-border use of mixed systems -- those scatterable systems that contain a mix of AT mines and APL (and that make up the majority of the US inventory). This limitation affects even Korea,

where ostensibly, fighting would not be limited to the currently established DMZ. The military has submitted yearly reports (as required by law)²³ on the effects of the use moratorium, but barring a congressional amendment, the moratorium will go into effect as scheduled.

A Shift in Tactics For the Ban Activists

Notwithstanding the "Use Moratorium," the ban activists recognized that arguments of military utility were forcing the APL debate into a new arena, where moral pleas alone might not be enough to carry the day. They therefore gathered their own military experts, in order to refute the president's advisors. The Vietnam Veterans of America Federation (VVAF), a member of the ICBL, sponsored an open letter to President Clinton, a letter that appeared as a full-page ad in the 3 April 1996 edition of the New York Times. Among other things, the letter stated, "Given the wide range of weaponry available to military forces today, antipersonnel landmines are not essential. Thus, banning them would not undermine the military effectiveness or safety of our forces, nor those of other nations."²⁴ The message was not new, but the list of endorsing names below it was indeed new, and very compelling -- 15 retired generals and admirals, among them General H. Norman Schwarzkopf.²⁵ This ad, coupled with reports from other "military experts" that refuted the utility of APL, gave the ban proponents an air of legitimacy they had lacked previously.

According to one author, the fact that so many well-informed senior military experts were (and are) divided on the issue means only, "...the US military has too many

senior generals.”²⁶ Aside from this rather tongue-in-cheek observation, it is also obvious that the issue is contentious and confusing, even to the informed. As Commander-in-Chief, President Clinton had to make a decision that both would keep America on the forefront of the APL issue and would appease his top military advisors. That decision came in May of 1996.

The Presidential Decision -- A Happy Middle Ground?

In a press conference on 16 May 1996, President Clinton directed, “...that effective immediately, our armed forces discontinue the use of so-called ‘dumb’ anti-personnel mines, those which remain active until detonated or cleared.”²⁷ Further, the dumb mines in the US arsenal (some 4 million) were to be destroyed by 1999. The exceptions to these directives were those dumb mines, “...required to defend American forces and our allies from aggression on the Korean Peninsula and those needed for training purposes.” Also exempted from this unilateral action were the military’s family of scatterable mines (FASCAM), the smart, self-destructing mines, which, “...pose virtually no threat to civilian life once a battle is over.”²⁸

However, the President made it clear that even smart APL were targeted for removal, once the military had developed viable alternatives to their use. In fact, said the president, the US, “will seek a worldwide agreement as soon as possible to end the use of *all* anti-personnel mines,”²⁹ [emphasis added]. In a later question and answer period, Secretary of State Warren Christopher suggested that one possible forum for such a worldwide agreement would be the Conference on Disarmament (CD) in Geneva -- the

same forum that had produced the chemical weapons convention and was then moving forward on a comprehensive nuclear test ban.

Reaction to the president's announcement amounted to guarded optimism on both sides of the issue. The military saluted smartly and began implementing the president's directive, thankful for the Korean exemption and convinced in any case that smart mines were sufficient in other areas, (assuming of course that the military could convince congress to reverse the "Use Moratorium").³⁰ Ban activists weakly applauded the measure, but expressed the valid concern that the CD was too slow a process to effect an immediate change in the crisis. This was, after all, the same process that took 16 years to produce the Chemical Weapons Ban, and a full 23 to achieve a Nuclear Test Ban.³¹ Indeed, it may have been the sluggishness of the CD process that appealed to the military, since it would give them the requisite time to develop alternatives to the APL.

Canada's Offer and the World's Reaction

In any case, this became a moot point four months later when Canada preempted the United States' efforts by initiating the Ottawa Process. In October, 1996, the government of Canada invited like-minded nations to meet in December of 1997 to ban universally all APL by the year 2000. There would be no more excuses or exemptions, no holding out for slow-moving processes, just an open invitation to responsible nations of the world to weigh the military utility of landmines against their adverse humanitarian impact.³² Predictably, this invitation lent new levels of international awareness to the issue, boosted as it was by the untimely death of Princess Diana. Just as predictably, the

US was viewed with suspicion for its failure to join immediately this noble cause. By continuing to promote the CD as the only responsible and comprehensive ban mechanism, the US ceded the moral high ground yet again – perhaps for the final time.

Still, in August of 1997, the president sent representatives to the Oslo Conference (the precursor to the final treaty signing in Ottawa) in an attempt to salvage an agreement the US could, in good conscience, sign. The two main points of contention were a US-requested nine-year grace period in Korea in order to allow the US to develop alternatives to APL, and an exemption for our mixed systems -- smart AT mines that contain a mix of APL to hinder enemy breaching operations. What is lost on many people is the fact that the US was even willing (and the President in fact has directed the military) to stop using APL-pure smart mines by the year 2003. In the end, the Oslo negotiators could not support these requests, so the US bowed out of the process. By way of explanation, the President said simply, "...there is a line that I simply cannot cross, and that line is the safety and security of our men and women in uniform."³³

Thus, in December of 1997 did 122 nations join Canada in signing the provisions of the APL ban. Shortly after that, Jody Williams accepted the Nobel Peace Prize for her efforts as the American coordinator for the ICBL. Meanwhile, the US found itself in the company of other "irresponsible" nations, such as China, Iraq, Iran, and Libya.³⁴ Now it is time to analyze whether or not the US, in fact, committed an immoral act. In convincing us that it has, the ban activists have gone to great lengths to show that APL do not have – in fact have never had – significant military utility. The next section of this paper consists of historical analyses to determine the veracity of one general's contention

that, "[W]here 'regular military use' is concerned there is no case known where AP mines...have influenced a campaign, a battle, or even a skirmish in any decisive way."³⁵

III. Military Utility of APL in the Past

*"In 'conventional' wars, no campaign can be found in which the AP mine was by itself a battle-winning weapon."*³⁶

- International Committee of the Red Cross

The above quotation almost certainly is true of APL. However, it may be just as true for any weapon ever developed, and it is hardly evidence for a ban. Simply because a weapon is not, by itself, battle-winning does not mean that weapon has no valid place on the battlefield. In questioning the battle-winning properties of APL, the ban activists have used as their main criteria the number of enemy soldiers killed or wounded by mines during a battle and the ability (or lack thereof) of APL to stop cold an enemy attack.³⁷

Limited to these rather restrictive criteria, the utility of APL certainly is suspect.

However, such elementary analyses overlook the secondary and tertiary impact of APL on battles and campaigns: what APL may cost an enemy in terms of time, resources, and effort; what they may have forced the enemy to do, or conversely, what they may have prevented him from doing. Even a cursory historical analysis indicates that such indirect contributions, while not necessarily decisive, are indeed considerable.

APL Use in the Korean War

The Korean peninsula, possessed as it is of rugged, mountainous, wooded terrain, offers very restrictive mobility corridors for mounted offensive warfare. Such terrain would seem ideally suited to APL use. Surprisingly, however, the early stages of the

Korean war were marked by relatively fluid situations where mine warfare in general, and specifically APL, played only a small role.³⁸ One notable exception occurred when UN forces found themselves surrounded and in danger of defeat in the Pusan Perimeter.

After having retreated south from the 38th parallel to a tight perimeter around the vital port of Pusan, the beleaguered troops of the UN ground forces, collectively known as the Eighth United States Army (EUSA), found themselves in dire straits. Subject to constant attack, they were tasked to hold the line until the US X Corps could land at Inchon and relieve the pressure.³⁹ Failure to accomplish this Herculean task would almost certainly result in a disastrous UN defeat. In assaulting the perimeter, North Korean forces found they could not use the outflanking tactics that had been so successful earlier. They were forced instead to employ frontal assaults in very restrictive terrain. It is here that mine warfare played a significant, if not a battle winning, role.

The Mines That Saved Sinnyong

Defending in the northern part of the Pusan perimeter, the Republic of Korea (ROK) 6th Division, was a rare exception to the poorly trained and organized forces that characterized much of EUSA. This division, "had been made combat-ready before the invasion began."⁴⁰ By the end of August 1950, then, when the North Korean Peoples Army (NKPA) conducted one final, coordinated assault along the length of the perimeter in a do-or-die effort to drive UN forces to the sea, the 6th Division defended brilliantly. They did so with mines.

To the rear (south) of the 6th Division lay the town of Sinnyong, a critical road and rail junction within the Pusan Perimeter, and the location of the ROK II Corps headquarters. The major avenue of approach through the 6th Division defense was the Yongchon-Andong highway, running southeast to northwest and surrounded by mountains.⁴¹ Opposing the 6th Division were parts of the North Korean 1st, 8th, 14th, and 15th Divisions. Not only was the North Korean infantry a constant menace, but from the high ground astride the highway, the enemy lobbed tank rounds into the town of Sinnyong.

Fearful of the enemy tanks, and aware of the massive North Korean build-up and preparation for an attack, the 6th Division commander tasked his engineers to block the highway.⁴² That night, the engineers laid 40 anti-tank mines at a chokepoint on the highway. Under each AT mine, they placed an M3 APL with trip wires. Then they placed an additional 52 APL with trip wires along the narrow shoulders of the road. These latter two steps were to, "...take advantage of the [North Korean] practice...of surrounding their tanks with engineers to clear mines and infantry to prevent close-in attack."⁴³ Within two days, additional APL were lain in two other belts just east of the highway.

At 0200 hours on 1 September, a company of North Koreans attacked. Almost the entire company was in the minefield before the first tripwire activated. Chaos ensued as the men attempted a retreat, activating more tripwires as they ran. According to one account, "The whole affair lasted scarcely five minutes, yet we estimated a hundred casualties."⁴⁴ Two days later at the choke point, the 6th Division executed a tank trap

that resulted in five enemy tanks destroyed. When the accompanying enemy infantry rushed to the shoulders of the road, as anticipated, they ran into a maze of APL that killed upwards of 50 men.⁴⁵

By 5 September, the 6th Division had to shorten its lines, because the North Koreans had driven the 8th Division (on the right) back to Yongchong, some ten miles to the rear. According to an American military advisor, "...it was minefields that gave us time to move and erect a defensive barrier."⁴⁶ As the infantry withdrew, "...the enemy attacked banzai style and a regiment strong...Rifle and machine-gun fire did not stop the enemy, but mines stopped them cold...The attack soon stopped and our men withdrew without further interference."⁴⁷ The 6th Division defense had held. Ten days later, the successful landing at Inchon by the US X Corps would reverse the fate of the besieged Eighth US Army.

The Mines That Saved an American Platoon

By the Spring of 1952, the Eighth US Army had driven the North Koreans to the Yalu River and virtually out of the war. Subsequent massed attacks by Chinese communist forces had driven the Americans back south to the 38th Parallel. Here the war had stabilized, with each side conducting limited (albeit violent) attacks in an attempt to win the upper hand in the ongoing peace negotiations.⁴⁸ It was after one such successful attack in March that Lieutenant Bernard Trainor and his platoon set up a defense on their newly gained objective, Hill 59.

Trainor fully expected the Chinese to attack in an attempt to retake the hill, so he had his platoon lace the front of the position with a hasty protective minefield. The Chinese did not disappoint...and neither did the APL. Contrary to many popular accounts of "human wave tactics," the Chinese in Korea actually were expert infiltrators who used stealth and the cover of darkness to sneak up on unsuspecting defenders.⁴⁹ This is exactly what they attempted late that cold March night. As his platoon fought in violent, close combat, Trainor recalls hearing over the din of battle, "...mines detonating and shrieks of agony." Ultimately, Trainor's platoon defeated the Chinese attack and retained the hill, a fact that he attributes to the APL in his defense.⁵⁰

Analysis of APL Use in Korea

The preceding scenarios represent but small pieces of the Korean War puzzle. Clearly, throughout the three years of that war there would be myriad factors that would determine success or failure. The defense of the Pusan Perimeter and Hill 59 were neither the only, nor probably the most important, battles of the war. Also, it may be too much to claim that APL were battle-winning in these, or in any other, battles. However, to the extent that APL helped both to avoid disaster in the Pusan Perimeter, and to save one Infantry platoon on Hill 59, one must concede their effectiveness as a potential combat multiplier. In these engagements, one sees APL slowing enemy advances; buying time for defenders to reposition; forcing the enemy to expend resources; and contrary to the claims of ban activists, it appears, actually stopping cold an enemy attack. No less an authority than General Matthew Ridgway put the efforts of the 6th Division in

perspective, for instance, when he wrote, "If it were not for the fierce courage of those few ROK units that had been properly prepared for the fight, another day or two of priceless time might have been lost and disaster might have been complete."⁵¹

APL Use in the Desert

In stark contrast to Korea, the desert terrain of North Africa and Southwest Asia generally is open and flat, providing nearly unlimited maneuver space for mobile, armored forces. Indeed, the warfare of the past 50 years in this region has been exactly that -- fluid, fast-paced, and armor-oriented. One might think, then, that APL have played little or no part in shaping the battles and campaigns fought there. One would find himself at odds with history, as the following illustrative scenarios show.

Alam El Halfa – A Turning Point

The battle for North Africa during the Second World War provides an interesting study in mobile, armor-heavy warfare. For the better part of three years, the tank-based armies of the Allies and Axis pushed each other back and forth across the deserts of North Africa and the Middle East. Soon after one attacker reached culmination, the opposing defender would launch a counter-strike, aspiring to great success himself, until he too culminated. During this period, "Mines became the crucial artificial obstacles...as the opposing armies deployed themselves defensively in order to build up for another offensive."⁵² The battle of Alam El Halfa in Egypt during the summer of 1942 illustrates this point.

Having been generally out-maneuvered, out-witted, and out-fought to this point in the campaign, the British 8th Army found itself in the summer of 1942 arrayed defensively to the west and south of El Alamein, Egypt, preparing for yet another offensive, and desperately low in morale.⁵³ Facing the British was Rommel's vaunted Afrika Korps, which, despite its vast materiel inferiority and its shoe-string logistics, nonetheless preempted the 8th Army by launching its own attack. Montgomery, having recently replaced Auchinleck as the 8th Army commander, spent the month of August creating a defense in depth.⁵⁴ Integrated throughout the defense was a complicated and extensive array of AT and AP mines.

Thus when Rommel attempted to outflank the enemy defenses by attacking the Alam Halfa position in the Southeast portion of the 8th Army, he found that, "Artillery concentrations and a judicious mixture of anti-tank and anti-personnel mines" slowed his attack to the point that, "...the whole plan was thrown out of gear..."⁵⁵ Indeed, Rommel's previous successes in the desert had arisen out of his superior mobility over the British. Having lost this critical advantage, Rommel was subjected to not only the artillery and tank fire of the British, but also to the destructive fires of the RAF, "...who were able to rain down bombs on the [enemy] tanks as they struggled through the imperfectly cleared lanes."⁵⁶ As the tanks hit the AT mines, infantry and engineers moved forward to attempt breaches. It was here that APL had a devastating effect. According to one report, the repulse of the Afrika Korps during this critical battle, "...was due largely to the brief but fatal immobilization of that force in several undetected minefields..."⁵⁷

Historians have debated the significance of the battle of Alam El Halfa within the context of the war in North Africa. Whether or not it was a decisive battle, it clearly resulted in a “reversal of fortunes” of sorts for the British. Never again in the desert would Rommel mount a major offensive operation. Also, the morale of the 8th Army was raised immeasurably by this successful stand.⁵⁸ Evidence indicates that successful APL use played no small role in this turn of events. In the Second Battle of El Alamein, Rommel would learn painfully the cost of not having APL, as he tried to reverse the tide of war yet again by making his own defensive stand.

Second El Alamein – Hey, Brother, Can You Spare a Mine?

Having suffered a costly defeat at Alam Halfa, Rommel’s Afrika Korps retreated further west of El Alamein to make a defensive stand of its own. His emaciated army spent the next two months building a “sea of mines” from the Mediterranean coast to the impassable Qattara Depression in the south. Noteworthy is the fact that of the 500,000 mines emplaced forward of Rommel’s position, fewer than 14,000 (3 percent) were APL.⁵⁹ Rommel himself lamented this fact when he wrote later, “Most of the mines available...were unfortunately of the anti-tank type, which infantry could walk over. They were, therefore, relatively easy to clear.”⁶⁰ This critical shortage of APL would play a significant role in the outcome of the battle.

No one more than Montgomery understood the importance of mine clearing for the upcoming operation. In fact, he directed his chief engineer, F.K. Kisch, to set up and operate the 8th Army School of Mine Clearance.⁶¹ During its training, the school

experimented with Scorpions -- Matilda tanks fitted with mine flails -- but found these to be unreliable. Thus, during the battle, mines would be cleared the way they had always been -- by hand.⁶² It is critical to understand that, under Montgomery, mine clearing had become an extremely complicated operation, executed by highly-drilled teams of engineers.⁶³ In other words, not just any soldier could be expected to jump into a minefield and begin breaching. A critical loss of the highly-trained sappers or their equipment might bring an offensive to a premature and permanent halt. In the event, this is almost (but not quite) what happened.

On the evening of 23 October 1942, the numerically superior 8th Army began its assault on the skeletal remains of the Afrika Korps. Not until nearly three days later did the British armor supporting the main effort in the north manage to cut its way through the first mine barrier.⁶⁴ The two supporting efforts in the south could not yet lay claim to even this meager achievement. To a man, Montgomery's subordinate commanders began to doubt whether they could penetrate the mine fields. In the end, of course, they did just this, fitting testimony both to Montgomery's persistence and to the survivability of his sappers, who had only to contend with direct and indirect fires, not the demoralizing and deadly effects of APL. The 8th Army finally broke Rommel's defenses and forced his retreat to the west, but it took twelve grindingly slow days and an appalling number of casualties. Perhaps the outcome was pre-ordained, given the vast overmatch Montgomery enjoyed in numbers and equipment. One who believes that should note however that, "...Montgomery came startlingly close to calling off..." this battle on more

than one occasion.⁶⁵ One wonders whether a few more APL at critical breaching locations may have forced his hand on this issue.

Analysis of APL Use in the Desert

Just as with the examples in Korea, there is little evidence that APL in the desert have ever been, by themselves, battle-winning. Moreover, history provides bountiful evidence that APL sometimes were used improperly, often doing more harm than good to the friendly force. That is not to say (as some people have) that they have played no significant role in determining the outcomes of past battles. Indeed, (and somewhat surprisingly), one finds that APL may have had as direct an impact on highly-mobile, desert warfare as on the more restrictive warfare of Korea. At Alam Halfa, as at the Pusan Perimeter, APL gave a desperate and besieged defender a decided edge, allowing him to retain terrain and combat power, while forcing the enemy to expend massive effort and resources in ultimately failed efforts. Additionally, the Second Battle of El Alamein points to a quite different phenomenon -- the possible consequences for an outnumbered force when it has to defend without the benefit of APL. Evidence indicates that at least one man, Erwin Rommel, thought the consequences were grave indeed. It is important to bear this latter point in mind as this paper shifts to the present by examining modern US Army mine doctrine, and applying it to these same regions of the world.

IV. Military Utility of APL in Modern War

*"Aptitude for war is aptitude for movement."*⁶⁶

- Napoleon I: Maxims of War, 1831

The Army's capstone doctrinal manual, Field Manual 100-5, defines maneuver as, "...the movement of forces in relation to the enemy to gain positional advantage."⁶⁷ It is just such movement to which Napoleon was referring, and at which his armies were so proficient. Indeed, so important is the concept of maneuver in warfare that the US Army has long listed it as one of the "Principles of War." Not surprisingly, armies the world over also adhere, at least in some measure, to the concept. It stands to reason then that an army, especially when forced to defend, will seek through countermobility operations to deny its opponent the benefits of maneuver. This section of the paper will explore the role and capabilities of mine warfare in US Army countermobility doctrine. Then it will overlay that doctrine onto the two AORs under consideration to see whether or not APL still retain significant military utility.

The Current Role of APL in Countermobility Doctrine

The role of countermobility, as already mentioned, is to deny or restrict an enemy's freedom of maneuver through the use of obstacles.⁶⁸ Doctrine recognizes two broad categories of obstacles: existing and reinforcing. An example of the former is the Qattara Depression in the Second Battle of El Alamein. The latter category consists of obstructions, emplaced by military forces, which are integrated with, or "tied in" to existing obstacles.⁶⁹ There are numerous ways to create reinforcing obstacles. This paper will address only one of them -- the minefield.

Doctrinally, there are three types of minefields a commander may employ: tactical, protective, and phony.⁷⁰ The first of these, the tactical minefield, seeks, "to

directly attack enemy maneuver and to give the defender a positional advantage over the attacker.” There are four specific battlefield effects that tactical minefields may achieve. They are, in increasing order of minefield complexity and density: disrupt, fix, turn, and block.⁷¹ As their names imply, each of these seeks a slightly different effect on the enemy, but the overall purpose remains to attack enemy maneuver, thereby bestowing upon the defender a positional advantage. Interestingly, doctrine does not call for APL in either the disrupt, fix, or turn obstacles. That is not to say the commander may not employ APL in these minefields, just that doctrine does not mandate them. That distinction is reserved for the tactical block minefield alone.⁷²

The second type of minefield -- the protective minefield -- is, “...employed to protect the defending force from the enemy’s final assault.” In terms of location, it is normally much closer to friendly forces than is the tactical minefield, and it represents a key component of survivability operations.⁷³ There are two types of protective minefields: hasty and deliberate. The former is part of a unit’s defensive perimeter, while the latter is designed as a more permanent measure to protect critical assets, or permanent defenses.⁷⁴ The composition of the protective minefield -- hasty or deliberate -- is dictated by the enemy threat and the particular vulnerabilities of the defender. It may contain any mix of AT mines and APL.

The final type of minefield is the phony minefield, so-named because it seeks to, “...confuse the attacker’s breach decision cycle [causing] him to second-guess his breach decisions...” and, “...to wastefully expend breach assets to reduce mines that are not really there.”⁷⁵ To be truly effective, the phony minefield should replicate in every way an

actual minefield, to include the proper mix of mines and the tell-tale signs of ground disturbance. Also, the enemy must have been made mine-conscious, having, "...already suffered the consequences of a [real] mine encounter..." prior to encountering a phony minefield.⁷⁶

By way of review then, mine warfare accomplishes several battlefield functions. It affects adversely enemy maneuver, transferring the initiative to the defender. It forces the enemy to expend time and resources in breaching efforts. It destroy or damages enemy personnel and equipment. Finally, it protects defending forces from being overwhelmed by an enemy assault. Moreover, mines may be used in the offense to protect exposed flanks, isolate an objective, and disrupt enemy retrograde operations.

The role of APL in accomplishing these functions varies according to the nature of the threat. While doctrine does not call specifically for APL in three of the four tactical minefields, it is clear that APL are authorized and may be necessary to thwart manual breaching efforts. Indeed, the Army has expended no small amount of energy in convincing congress and the president that this is in fact the case, that APL are critical to the success of nearly all minefields and are a critical component of its mixed systems. Perhaps then, written mine warfare doctrine should be adjusted, lest some perceptive ban activists use the Army's doctrine against it. Nonetheless, in the case of the tactical block minefield, doctrine mandates absolutely that APL are necessary. Similarly, doctrine clearly envisions APL use in protective minefields. Before transposing this doctrine on the two AORs that comprise the focus of this paper, it is necessary briefly to explore the US Army's current and emerging APL capabilities.

Current and Emerging APL Technologies

As mentioned earlier in this paper, APL (like AT mines) fall generally into one of two categories: conventional (dumb) and scatterable (smart). Each of these categories has advantages and disadvantages from the viewpoint of the user. Conventional APL, (which, as a reminder, are no longer in use by US forces, except along the DMZ in Korea), normally are emplaced and armed by hand, and often are dug in. This is a very time-consuming and labor-intensive process. However, it does allow for precise and well-hidden emplacement, a virtue that appeals particularly to the defender who wants a protective minefield placed close-in to his position. A conventional APL also is characterized by its permanence. This may be both an advantage and a disadvantage. For long-term defense, it provides a permanent barrier that requires only minimum maintenance. However, doctrine requires such mines to be recovered when the using unit departs -- again, a time-consuming process. Additionally, there are potential dangers to friendly maneuver when conventional minefields are improperly marked or not removed. Finally, there is the well-documented danger to non-combatants.

Scatterable APL offer the advantage of speed, because they are delivered mechanically by a variety of remote means, (artillery, aircraft, or ground dispenser), and because they are self-arming. The manner of delivery also allows for placement in areas that US ground forces do not control.⁷⁷ Such attributes are invaluable to the fast-paced, fluid situations of modern combat. However, remote delivery also results in a surface-laid minefield, which offers surprise only in limited visibility situations.

Unlike conventional mines -- and this is an important point that ban activists seem to be ignoring -- *scatterable APL are not permanent*. Depending on the type, these mines have a life-span ranging from four hours to fifteen days, after which they self-destruct. This self-destruct feature is backed up by a self-neutralization feature -- a function of limited battery life, (usually 90 days), after which the mine can no longer operate.⁷⁸ The temporary nature of these APL means they represent much less of a threat to friendly maneuver, and virtually no threat to civilians. However, this also calls into question their utility for long-term protection of US forces and facilities.

In response to presidential orders, the Army has begun exploring alternatives to all APL. The intent is to replicate the effects of APL while diminishing the civilian hazards. One category of alternatives involves increased force structure.⁷⁹ The idea is that by increasing the number of artillery tubes or maneuver units, one may achieve the same countermobility effects on the enemy, while decreasing one's reliance on APL. There are several drawbacks to this option, the most obvious being monetary. The military has been downsizing for nearly a decade, based primarily on budgetary constraints. It is unlikely that the necessary increases in manpower or equipment will be available to overcome the absence of APL.⁸⁰ Also, a solution such as increased artillery carries with it a humanitarian concern of its own. The danger to civilians from unexploded artillery ordnance almost certainly would be greater than the danger from self-destructing APL.

The second category of alternatives involves the research and development of new technologies to replace the APL. These new technologies focus both on lethal and non-

lethal systems.⁸¹ The lethal alternative would reduce the humanitarian threat by introducing a command-detonated, "man-in-the-loop" system, requiring the discriminating actions of a human. A concern associated with this system is whether the operator would be able, based on the threat, to detonate individual mines within a minefield, (a task, one suspects, that would require quick reactions and superb hand-eye coordination), or if he would face an "all or nothing" choice the minute one enemy soldier entered a minefield. Also, by requiring a man-in-the-loop, a unit may not be able to employ scatterable mines outside its visual range. Finally, such a system is almost certain to be more expensive than the Army's current inventory of APL.

The non-lethal alternatives range from sticky foam mines to so-called "sting nets" (nets that are charged with low-voltage electricity).⁸² While such systems might offer a delaying effect, it is not clear they would produce the same level of deterring effect as a lethal system. An attacking soldier who gets covered in sticky foam may not induce in his comrades an emotion any more intense than mild amusement -- probably nothing that would deter them from continuing the attack. On the other hand, a soldier who has his leg torn off by an APL may arouse a completely different emotion -- one that might induce his comrades to seek another approach.

Regardless of the new technology involved -- lethal or non-lethal -- and regardless of the drawbacks to any new system, it is important to note that currently, *no technology-based options to the APL are readily available for use*. Nor is it clear that any acceptable options will be ready by the president's 2003 "no APL" deadline. It is a virtual certainty that none will be ready by the 1999 date of the one-year congressional "Use

Moratorium.” What is left, then, is a potential (and fast-approaching) void in the Army’s countermobility capabilities. A look at the present-day situations in PACOM (Korea) and CENTCOM (Southwest Asia), will help to measure the width (and severity) of that void.

APL in Korea Today

“North Korea did not invade when the United States removed tactical nuclear weapons from the South. Take out the land mines and the North is not going to invade.”⁸³

- Nobel Peace Laureate Jody Williams

While one appreciates Ms. Williams’ status as a Nobel Laureate, one also is tempted to question her abilities as a prognosticator of North Korean intent. In any case, it is doubtful that her laughably shallow appraisal alleviates significantly the concerns of the friends and family members of 37,000 forward-deployed American troops. The simple fact is that North Korea has long-maintained its intent to unify the entire Korean Peninsula, by force of invasion if necessary. The United Nations has made a commitment to protect South Korea from such an invasion. The Eighth United States Army and its South Korean allies (landmines and all) are the manifestation of that commitment.

A quick glance at the Korean Peninsula reveals that very little indeed has changed in the past 45 years. The terrain still is rugged, mountainous, and wooded. High-speed, armor-oriented maneuver corridors still are scarce. And two opposing armies still are arrayed on either side of the 38th parallel. One considerable change that *has* taken place is the politically-induced UN requirement to defend absolutely the South Korean capital of Seoul -- only 27 miles from the DMZ at its shortest point. While no one can predict precisely how a North Korean attack would take shape, most analysts agree that rapid

capture of Seoul is critical to North Korean success. According to one estimate, in order to do this, "...the North Koreans would try a blitzkrieg-type attack...to accomplish their military objectives before US reinforcements can arrive..."⁸⁴ The capture of Seoul, incidentally, need not involve actual North Korean occupation. By encircling the city and holding its occupants hostage, the North Koreans might gain the upper hand in a negotiated settlement. Either way, the Eighth US Army and its South Korean allies must prevent such capture. They cannot suffer another "Pusan Perimeter."

The specific war plans for the defense of South Korea are classified, but the expected phases of battle can be described in generic terms. In the initial defense, the UN forces would seek to block the major avenues of approach along the DMZ. Using a complex array of anti-tank and anti-personnel obstacles, along with complete air superiority, the UN forces would attack the advancing enemy as he struggled across the DMZ. Since the "Use Moratorium" does not restrict APL along the DMZ, the defenders can use mixed systems against armored threats, and APL-pure systems against dismounted threats. Given the sheer weight of numbers, however, the North Koreans are expected to make advances, thus moving the battle into the second (and critical) halting phase.

During the halting phase, UN forces would react to successful enemy penetrations by maneuvering ground and air assets as needed to culminate enemy attacks, prevent the capture of Seoul, and most importantly, to buy time for the build-up of reinforcements on the peninsula. Success during the halting phase, followed by a rapid build-up, will facilitate transition to the final phase -- decisive operations to reestablish the DMZ.

Failure during the halting phase may have dire consequences indeed. It is here, during the halting phase, that the absence of APL will have the largest operational impact.

Since combat operations south of the DMZ are subject to the "Use Moratorium," US forces would not be allowed to employ mixed-system mines to help block penetrations and shape the battlefield for future operations. Moreover, they would be denied the use of APL-pure systems to prevent dismounted infantry assaults. According to General John Tilelli, Commander in Chief of US forces in Korea, "These systems are critical components of my overall defensive plans..." and, "the...moratorium causes me concern."⁸⁵ His concern appears to be very well-founded.

The US Army Concepts Analysis Agency (CAA) -- the Army's highly-credible center for strategy and force evaluation -- conducted a comprehensive, operational-level analysis of the impact of fighting in Korea without APL. Their analysis was based, not on a fanciful guess of how to defend South Korea, but on the real world operational plan. To put not-too-fine a point on their results, the CAA found that the risk to operational success in Korea if APL are banned is high to unacceptable.⁸⁶ Specifically, the study indicated that, without APL use, the enemy culmination is delayed, the enemy penetration is more successful, and US casualties are from ten to thirty per cent higher.⁸⁷ The unclassified portion of the results does not indicate whether North Korean forces are successful at capturing Seoul, but one may draw one's own conclusions, based on a level of risk that borders on "unacceptable."

The results of the CAA study in Korea, incidentally, were reinforced at the tactical level in a separate study headed up by Lawrence Livermore National Laboratories

(LLNL). Using a variety of small-unit tactical scenarios, the study concluded that the increase in Blue force (US) casualties between the APL and no APL case was 22 percent.⁸⁸ Moreover, the study found that the presence of APL increased the time required for a successful enemy breach by, “almost a factor of ten...”⁸⁹ In warfare, perhaps more than in any other venue, time is a “four letter word.” To the extent that APL can buy time for the vastly outnumbered forces in Korea, their impact appears to be significant, if not decisive.

APL in the Desert Today

Unlike in Korea, there are no forward-deployed US Army divisions stationed permanently in Southwest Asia. Yet the military threats in this region of the world are no less real than is the one in Northeast Asia. The difference, of course, is the strategy for meeting them. Should an emergency erupt in the desert, the Army would have to rely on power projection to build up its forces for the fight. In simple terms, this means an outnumbered force (probably a light or airborne division) will have to check the enemy advance until the US can complete its build-up.

It is during the critical build-up phase that the absence of APL will have its largest impact. To understand this, it is important to know that the successful US build-up prior to the coalition victory in Desert Storm was, in many respects, an anomaly. It was, in fact, the fortuitous result of three rare conditions. First of all, Saudi Arabia is a mature theater, with well-developed ports, airfields, roads, and facilities.⁹⁰ Secondly, it is a theater that the US entered at the behest, (and with the permission), of the host nation. In

other words, the US did not have to conduct forced entry operations. Thirdly, and perhaps most importantly, Saddam Hussein either was unwilling or too inept to interdict the build-up.

Assuming that Iraq remains the most likely future threat in the region, the first of these conditions remains constant. In other words, Saudi Arabia is possessed of the facilities necessary to repeat a Desert Storm-type build-up. However, as recent events have shown, the US may have trouble gathering the coalition support necessary to gain unfettered access to ports and airfields in the region -- hence the possible need for forced entry operations. In any case, it is a virtual certainty that Saddam (along with any other potential foe) will be reluctant to stand idly by while the US conducts massive port and airfield operations.⁹¹ The most likely scenario then is that a small US force will have to secure the necessary ports and airfields against preemptive ground and air attacks while the US conducts force projection operations. The contribution of APL in accomplishing this task appears to be significant.

Just as with the Korean scenario, the CAA conducted operational-level analyses of a potential ground conflict in Southwest Asia. The study concluded that, lacking APL, there is a "significant risk" from Iraqi interdiction to port operations. Specifically, the report concluded that: enemy culmination is delayed; US personnel and equipment losses increase by more than fifteen percent; and enemy penetration is deeper toward critical build-up facilities.⁹²

In their arguments against APL, ban activists have made much of the so-called "changed nature of warfare," which supposedly has rendered mines irrelevant,

particularly in a desert environment. Perhaps overly impressed by Desert Storm's images of push-button, precision killing and massive armored sweeps, these self-proclaimed experts are convinced that APL would not only be ineffective, but also would pose a menace, "to our brand of mobile warfare."⁹³ Drawing on what they believe were the salient lessons of the Gulf War, the ban activists discount the significance of Iraqi minefields by observing that, "most minefields were simply bypassed." Where breaching was necessary, so say the activists, "Coalition forces...breached the Iraqi minefields where and when they wanted to with apparent ease."⁹⁴

The record shows, however, that neither bypassing nor breaching an enemy minefield is simple or easy.⁹⁵ Coalition success at conducting these operations in the desert was the result of painstakingly thorough planning, superior breaching equipment, absolute air supremacy (which prevented Iraqi interdiction of breaching efforts), and above all, superb leadership and execution. To bestow upon the enemy those same qualities that allowed coalition forces to breach or bypass with "apparent ease," and to use such logic as evidence for the ineffectiveness of APL is to display a profound ignorance of modern war. The truth is, our "brand of mobile warfare," whatever that may be, still is limited largely by the capabilities both of the internal combustion engine and the terrain on which it operates. So will it be for the future enemy. And so will the APL represent a critical component of the Army's countermobility doctrine.

Summary of APL in Modern War

As one might expect, ban activists pounced quickly on the CAA report, especially its analysis of APL in Korea. According to the authors of Exploding the Landmine Myth in Korea, an “unnamed US government source” declared that the assumptions underlying the CAA study were faulty, thus leading to grossly exaggerated estimates of North Korean success. Among the so-called faulty assumptions were: a North Korean advance rate of 20 kilometers per hour (comparable to the US rate of advance in the Gulf); no warning time for a North Korean attack; and over-estimating the amount of delay provided by US APL.⁹⁶

A subsequent CAA rebuttal successfully refuted each of the criticisms. The North Korean rate of advance, for instance, was never assumed to be higher than 3 kilometers per hour in the study. The study also assumed sufficient warning of an attack, so that the allied defense was fully prepared. Also, enemy delays were consistent with experiential data and were based not only on the presence of APL, but on the combined effects APL, AT mines, trenches, and wire. In the end, the CAA concluded that the criticisms in the Exploding the Myth report reflected, “...a lack of current knowledge and experience in the Korean Theater of operations...” and also that the unnamed government source, “was either misinterpreted or at best misunderstood.”⁹⁷ This exchange between the ban activists and the CAA is significant, because it illustrates two important points. Firstly, although the CAA analysis was predicated on assumptions, (not all of which may be totally accurate), it does represent a well-researched attempt, based on real-world data, to quantify the results of an APL ban. Secondly, the ban activists, (as has become

customary), prefer to rely on emotion and unfounded assumptions to make their arguments. It is perhaps their good fortune that they will never have to test the validity of their assumptions, or pay the price in blood for being wrong. American soldiers in Korea and Southwest Asia are not so lucky.

V. Conclusion -- Is Utility the Point?

There are two conclusions one may draw readily from the evidence in this paper. The first is that APL do indeed have a measurable and considerable military utility. The second is that it probably doesn't matter. Ultimately, one suspects, the APL issue will be decided, not on the basis of military utility, but on the basis of political expediency and morality. The domestic and international pressure to conform to the provisions of the Ottawa Process is immense. If the president is unwilling to succumb to international pressure, congress has shown it is prepared to force his hand domestically by passing unilateral legislation. The evidence may show that ban activists are ill-informed on the issue of military utility, but that does not matter. As senator Leahy wrote in an editorial in the *New York Times*, "Utility isn't the point in [the] ban on landmines."⁹⁸ The Army should note carefully that statement, because it typifies what the military is up against. When threatened with cogent arguments, the activists can always pull out a picture of a maimed child to make their point. It is a point with which no argument of military utility can compete.

Let the record show, however, that APL have had in the past a profound and positive impact on military operations. In the two AORs under consideration, APL often

have been a significant factor in deciding the success or failure of a military operation. Moreover, based on the evidence, there is every reason to believe that the future use of APL will be just as significant, not only in Korea, but also in the deserts of Southwest Asia. Perhaps this last point is surprising, given that most arguments against the ban have centered on the "unique" circumstances the Army faces in Korea. If the Army forswears the use of APL outside Korea, however, the costs may be just as steep. Perhaps Korea is not so unique after all.

Let the record show also, that no innocents are being killed or maimed by US-deployed APL. This is because the US relies primarily on self-destructing APL, but also because it uses non-self-destructing APL in accordance with internationally-established humanitarian law. Nevertheless, the Army is being forced to justify its use of APL, even while it pours scarce resources into developing replacements for a system that is not broken. Moreover, the Army is trying desperately to retain some APL capability by renaming the APL in its mixed systems as "explosive anti-handling devices." Such semantic sleight of hand has not fooled the ban activists. Nor will it go far toward helping the Army retain APL. This is, after all, an issue of morality.

But the ban activists should know a couple of things about morality prior to lighting up the victory cigars. First of all, the Ottawa ban, "...has not reduced the land-mine casualty count by one leg or restored one acre of land to the population of a mine-contaminated country."⁹⁹ Try as one may, one cannot outlaw the 110 million land mines already in the ground. While the ICBL celebrates the Nobel Peace prize, hundreds of innocent people each week continue to fall victim to APL. Their plight will benefit far

more from demining efforts than from a well-meaning but ineffectual ban. No nation has done more than the US in this regard, both with monetary aid and demining assistance.¹⁰⁰

Secondly, the activists should know that none of the 122 nations that signed the Ottawa Treaty carries on its shoulders the international security responsibilities that the US carries. It is doubtful that Barbados or Sweden, for instance, will be called upon militarily to defend democracy in South Korea, or to prevent a third-world dictator from subjugating his neighbors in the deserts of Southwest Asia. The US bears the lion's share of responsibility for these problems. If one bothers to look at the issue objectively, one sees that US-deployed APL go a long way toward securing peace and democracy around the world, and that, after all, has a morality all its own.

VI. Epilogue

Somewhere in Angola, the peaceful night air suddenly is pierced by a deafening explosion and the shrieks of a small child. A mother cries in heart-wrenching sobs at the loss of her baby. Half a world away, a United States senator shrugs apologetically -- he meant well. The international media has moved on to other things, such as the ongoing military operations to relieve the besieged city of Seoul, and the trail of US Army body bags arriving daily therefrom. The United States assumed the moral high ground one last time on 12 February 1999. Now, emotions run high, confusion is rampant, and the toll of victims grows. All is not well.

ENDNOTES

¹ International Committee of the Red Cross, *Anti-personnel Landmines: Friend or Foe? A study of the military use and effectiveness of anti-personnel mines* (Geneva: ICRC Publications, 1996), 9. See also US Congress, Senate, *The Global Landmine Crisis: Special Hearing Before a Subcommittee of the Committee on Appropriations* (Washington, D.C.: United States Senate, 103d Congress, 2d Session, 13 May 1994), 1, 23. Aside from these two sources, the reader can find numerous others that report the statistics on the landmine crisis. In doing so, the reader will note a wide divergence in the estimated number of mines present and in the number of casualties caused. Estimates range from 70-200 million APL currently in the ground. Similarly, the number of yearly casualties ranges from 8000 to 26,000, depending on the source one reads. The uncertainty over these numbers illustrates the confusion surrounding the issue. For the purposes of this paper, the given numbers are generally accepted as accurate and reflect the most often quoted statistics. Regardless of the numbers used, all sources confirm the gravity of the problem and the massive human toll it extracts.

² As defined by the United Nations at the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (CCW), Protocol II (Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices). Information found in Jozef Goldblat, *Agreements for Arms Control: A Critical Survey* (London: Taylor & Francis LTD. and Cambridge, MA: Oelgeschlager, Gunn & Hain, INC., 1982), 299.

³ Colin King, "Legislation and the Landmine," *Jane's Intelligence Review: Special Report No 16* (United Kingdom: Jane's Information Group Ltd., November 1997), 18.

⁴ See Goldblat, 299. The CCW defines a booby trap as, "...any device or material which is designed, constructed or adapted to kill or injure and which functions unexpectedly when a person disturbs or approaches an apparently harmless object or performs an apparently safe act."

⁵ C.E.E. Sloan, *Mine Warfare on Land* (London: Brassey's Defence Publishers, 1986), 1.

⁶ Ibid.

⁷ Russel Stolfi, *Mine and Countermine Warfare in Recent History, 1914-1970* Study prepared for the Office of the Director, Aberdeen Proving Ground, Maryland (Alexandria, VA: Defense Technical Information Center, 1972), 12-15

⁸ As an example, according to one source, in the battle of Second El Alamein alone, Rommel's Africa Corps employed 500,000 mines of all types. See Erwin Rommel, *The Rommel Papers* Edited by B.H. Liddell Hart, Translated by Paul Findlay (New York: Harcourt, Brace, 1953), 300.

⁹ Sloan, 35.

¹⁰ International Committee of the Red Cross, *Anti-Personnel Landmines: Friend or Foe?*, 10.

¹¹ Carl von Clausewitz, *On War*, trans. and ed., Michael Howard and Peter Paret (New York: Albert Knopf, 1993), 77.

¹² King, 6.

¹³ Department of Political and Security Council Affairs, United Nations Centre for Disarmament, *The United Nations Disarmament Yearbook, Volume 5: 1980* (New York: United Nations, 1981), 296. The full text of the CCW is found in Goldblat, *Agreements for Arms Control: A Critical Survey*, 296-302.

¹⁴ *Ibid.*, 315.

¹⁵ International Committee of the Red Cross, *Anti-Personnel Landmine: Friend or Foe?*, 24-5. By way of comparison, 186 states ratified the 1949 Geneva Conventions and 143 ratified one or both of the 1977 Protocols additional to the Geneva Conventions, 25.

¹⁶ Cyrus Vance and Herbert S. Okun, "Eliminating the Threat of Landmines: A New US Policy," in *Clearing the Fields: Solutions to the Global Land Mines Crisis*, ed., Kevin M. Cahill, M.D. (New York: BasicBooks, A Division of HarperCollins Publishers, Inc., 1995), 202.

¹⁷ US Department of State, *Hidden Killers: The Global Problem With Uncleared Landmines* (Washington, D.C.: United States Department of State, Political-Military Affairs Bureau, Office of International Security Operations, July 1993), i.

¹⁸ US Congress, Senate, *The Global Landmine Crisis: Special Hearing Before a Subcommittee of the Committee on Appropriations*, 11.

¹⁹ *Ibid.*, 203.

²⁰ United Nations, *How Does the UN Work?* (January 1998) [WWW document]. URL <http://www.un.org/geninfo/ir/ch2/ch2.htm>

²¹ Among such reports are Notes from the International Committee of the Red Cross (ICRC) Symposium of Military Experts, January, 1994. and US Army Briefing for Conference on Landmines sponsored by the US Arms Control and Disarmament Agency, 16 August, 1995. As reported in International Committee of the Red Cross, *Anti-Personnel Landmine: Friend or Foe?*, 40. See also *The Military Utility of Landmines: Implications for Arms Control* (Alexandria, VA.: Institute for Defense Analyses, June 1994).

²² "Public Law 104-107, Section 580, Moratorium on Use of Antipersonnel Landmines," *United States Code Congressional and Administrative News: 104th Congress -- Second Session 1996* (St. Paul, Minn.: West Group), Volume 1, 110 Stat. 751.

²³ *Ibid.*, "Public Law 104-106, Section 1402, Reports on Moratorium on Use by Armed Forces of Antipersonnel Landmines," 110 Stat. 489.

²⁴ "An Open Letter to President Clinton," *New York Times* (3 April, 1996, sec. A), 11.

²⁵ When taken to task for having signed the open letter, Schwarzkopf later recanted his support for the ban (verbally, not in writing). He indicated that he believed the open letter referred only to dumb APL, not to the Army's Family of Scatterable Mines (FASCAM), which he believes are still critical to the military. The ban activists, however, make no such distinction. To them, a mine is a mine. They continue to wave the open letter as a banner of legitimacy for their cause, and, not surprisingly, they do not advertise Schwarzkopf's partial reversal.

²⁶ King, 13.

²⁷ President William J. Clinton, Presidential Address of 16 May 1996, *New US Land Mine Policy* (January 1998) [WWW document]. URL <http://www.defenselink.mil/pubs/di96/di1140.html>

²⁸ Ibid.

²⁹ Ibid.

³⁰ See Daniel P. Mahoney, *Goalie Without a Mask? The Effect of the Anti-Personnel Landmine Ban on US Army Countermobility Operations* Monograph, School of Advanced Military Studies (Fort Leavenworth, KS: US Army Command and General Staff College, First Term, AY 96-97). In this well-written study, the author concludes that the US Army can fight effectively without the use of dumb mines, except in Korea. He asserts, however, that until viable alternatives are developed for smart APL, a total ban of all mines would be dangerous for the Army.

³¹ Holly Burkhalter, "Phantom Pain: Banning Landmines," *World Policy Journal* (New York, Summer, 1997), 34.

³² King, 4.

³³ President Clinton, Presidential Address of 17 September 1997, *US Leads in Land Mine Removals While Others Talk* (January 1998) [WWW document]. URL <http://www.defenselink.mil/pubs/di97/di1247.html>

³⁴ For a complete list of signatories and non-signatories, see Vietnam Veterans of America Foundation, *Campaign Updates* (January 1998) [WWW document]. URL http://www.vvaf.org/landmine/us/updates/events97/news12_5a.html

³⁵ British General Sir Hugh Beach in testimony to the House of Commons in 1995, as reported in International Committee of the Red Cross, *Anti-Personnel Landmine: Friend or Foe?*, 44.

³⁶ International Committee of the Red Cross, *Anti-Personnel Landmine: Friend or Foe?*, 40.

³⁷ Ibid., 40-45.

³⁸ Stolfi, 100.

³⁹ George Forty, *At War in Korea* (London: Ian Allan, Ltd., 1982), 15.

⁴⁰ Matthew B. Ridgway, *The Korean War* (Garden City, New York: Doubleday & Company, Inc., 1967), 18.

⁴¹ John G. Westover, *Combat Support in Korea* (Washington, D.C.: Center of Military History, United States Army, 1987), 27.

⁴² Ibid., 28.

⁴³ Ibid., 29.

⁴⁴ Ibid., 30.

⁴⁵ Ibid., 32.

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- ⁴⁶ Ibid., 33.
- ⁴⁷ Ibid., 34.
- ⁴⁸ Forty, 15-20.
- ⁴⁹ Ibid., 61-3.
- ⁵⁰ Bernard E. Trainor, "Landmines Saved My Life," *New York Times* (28 March 1996, sec. A), 17.
- ⁵¹ Ridgway, 18.
- ⁵² Stolfi, 31.
- ⁵³ Department of Military Art and Engineering, *The War in North Africa: Part One (Operations in Egypt and Libya)* (West Point, New York: United States Military Academy, 1948), 10-19.
- ⁵⁴ John Strawson, *The Battle for North Africa* (New York: Charles Scribner's Sons, 1969), 125-27. Historians debate whether Montgomery or Auchinleck should receive the lion's share of credit for the defense at Alam Halfa. Indeed, Auchinleck had established the basic defensive array prior to Montgomery's arrival. Montgomery's main contribution may have been the way he shored up the defenses, but more importantly, the way he shored up the morale of the 8th Army prior to the battle. In the event, it was Montgomery who executed the successful defense, which is often viewed as the turning point in the battle for North Africa.
- ⁵⁵ Ibid., 128.
- ⁵⁶ Ibid.
- ⁵⁷ Stolfi, 32.
- ⁵⁸ Department of Military Art and Engineering, *The War in North Africa: Part One (Operations in Egypt and Libya)*, 22.
- ⁵⁹ Chief of Engineers, *Landmine and Countermine Warfare, North Africa: 1940-1943* (Washington, D.C.: Department of the Army, 1972), 80.
- ⁶⁰ Rommel, 300.
- ⁶¹ Jack Coggins, *The Campaign for North Africa* (Garden City, New York: Doubleday & Company, Inc., 1980), 31. Pages 30-33 of this book give an excellent account of the intricate procedures involved in manual mine clearing. The effort was extremely time-consuming and labor-intensive, even when unopposed. When the enemy's direct and indirect fires came into play, the procedure was even more problematic. If, on top of all this, one adds the constant threat of APL, mine clearing borders on the impossible.
- ⁶² Ibid., 33.
- ⁶³ British Ministry of Information, *The Eighth Army: September 1941 to January 1943* (London: His Majesty's Stationery Office, 1944), 77. This source provides another excellent account, in the words of an 8th Army soldier, of just how complicated (and slow) a breaching operation was.

⁶⁴ Stolfi, 37.

⁶⁵ Ibid., 38.

⁶⁶ Robert Debs Heinl, Jr. *Dictionary of Military and Naval Quotations* (Annapolis, Maryland: United States Naval Institute, 1966), 198 (cf, Movement).

⁶⁷ *Field Manual 100-5, Operations* (Washington, D.C.: Department of the Army, 1993), 2-5. As of this writing, a draft 1998 version of 100-5 is in print, but not yet approved. In the draft FM, the principles of war are renamed as "Principles of Operations," and there are ten listed, one more than the long-standing list of nine that dominated doctrine for many years. The draft manual defines maneuver as, "...shifting military power -- forces and effects -- to gain advantage."

⁶⁸ *Field Manual 5-102, Countermobility* (Washington, D.C.: Department of the Army, 1985), 17.

⁶⁹ Ibid., 17-36.

⁷⁰ *Field Manual 20-32, Mine/Countermine Operations* (Washington, D.C.: Department of the Army, 1992), 2-1. As of this writing, there is a draft 1998 version of FM 20-32 being written at the US Army's Engineer School in Fort Leonard Wood, Missouri. It is not yet in print. However, a telephonic interview with the Chief of Doctrine Development indicates that the basic concepts that form the basis for mine warfare remain unchanged in the new FM. It does, however, note the prohibition on conventional APL, except in Korea. The types of minefields, their purposes, and composition remain unchanged, except that all non-Korea APL must be self-destructing.

⁷¹ Ibid., 2-3 and 2-5.

⁷² Ibid., 2-9 thru 2-12.

⁷³ Ibid., 2-2.

⁷⁴ Ibid., 2-2 and 2-3.

⁷⁵ Ibid., 2-3.

⁷⁶ Ibid.

⁷⁷ Ibid., 6-5.

⁷⁸ LTC John Spinelli, Strategy, Policy and Doctrine Division; Strategy, Plans and Policy Directorate; Office, Deputy Chief of Staff for Operations and Plans, *US Military Use of Anti-Personnel Landmines (APL)* (PowerPoint Presentation to Dr. Shear, Assistant Secretary of Defense for Peace-Keeping and Humanitarian Assistance, 27 February, 1998), Slide 4. In a recent test of 32,000 smart APL, only one mine missed its self-destruct time; it was late by one hour. Further, even if the mine had not self-destructed, its limited battery life would have rendered it inert within no more than 120 days. This test is ignored by the ban activists, who insist that a mine is a mine, period.

⁷⁹ Modeling and Analysis Group, *APL Alternative Study: Final Report* (Office of the Under Secretary of Defense; in conjunction with Lawrence Livermore National Laboratory; TRADOC Analysis Center; US Army Infantry School Modeling Center; and the US Army Engineer School, final report undated), 27-30. These agencies conducted exhaustive analyses of possible alternatives to APL. The

analysis dealing specifically with increased force structure looked at three possibilities: increased maneuver units, increased artillery, and increased close air support. Each of these options, for different reasons, was found to be untenable as a replacement for APL.

⁸⁰ Ibid., The report determined, for instance, that an extra two platoons per maneuver company would be necessary to replicate closely the effects of APL. Similarly, a unit would have to dedicate three firing batteries to constant counter-mobility missions in order to achieve a similar effect. This latter option, incidentally, would not be possible as a protective measure, because of the proximity to friendly troops.

⁸¹ CPT Brian Green, "Alternatives to Antipersonnel Mines," *Engineer* (Washington, D.C.: Department of the Army), Volume 26, 11-13.

⁸² Ibid.

⁸³ Kyong-Hwa Seok, "Nobel Winner Visits Korea Mines," *The Associated Press* (5 February 1998, as downloaded from AOL News, Keyword NEWS).

⁸⁴ Steve Macko and Clark Staten, "How N. Korea Would Invade S. Korea," *The American Reporter* (22 May, 1996). As quoted by Demilitarization for Democracy, 5.

⁸⁵ From testimony by General Tilelli, before a hearing of the Senate Armed Services Committee, "For the Record," *Washington Post* (5 March, 1998), 20.

⁸⁶ Spinelli, *Anti-Personnel Landmine (APL) Study by the US ARMY Concepts Analysis Agency* (Unclassified PowerPoint Information Briefing, 12 June 1997), Slide 5.

⁸⁷ Ibid., Slides 7 and 8.

⁸⁸ Modeling and Analysis Group, *APL Alternative Study: Final Report* (Office of the Under Secretary of Defense; in conjunction with Lawrence Livermore National Laboratory; TRADOC Analysis Center; US Army Infantry School Modeling Center; and the US Army Engineer School, final report undated), 8. This particular scenario involved an air assault battalion defending against a North Korean mechanized brigade attack. Without APL to hinder enemy breaching operations, the Blue (US) force losses total 60 percent of the force.

⁸⁹ Ibid., 5.

⁹⁰ Jeffrey Record, *Hollow Victory: A Contrary View of the Gulf War* (Washington, New York, London: Brassey's (US), Inc., 1993), 148.

⁹¹ Norman Friedman, *Desert Victory: The War for Kuwait* (Annapolis, Maryland: Naval Institute Press, 1991), 255.

⁹² Spinelli, *Anti-Personnel Landmine (APL) Study by the US ARMY Concepts Analysis Agency* (Unclassified PowerPoint Information Briefing, 12 June 1997), Slides 5 and 6.

⁹³ Demilitarization for Democracy, *Exploding the Landmine Myth in Korea* (Washington, D.C.: A Research Report by Demilitarization for Democracy, August 1997), ii.

⁹⁴ International Committee of the Red Cross, *Anti-Personnel Landmine: Friend or Foe?*, 40.

⁹⁵ Tom Clancy with Frederick M. Franks, *Into the Storm: A Study in Command* (New York: G.P. Putnam's Sons, 1997), 226. According to this account, General Franks expected three fights for VII Corps, first against the entrenched front-line defending infantry, second against Iraqi tactical reserves (regular army), and third against the Republican Guard. The first of these fights was the subject of countless wargames and simulations prior to the initiation of the ground campaign. Clearly, the commander was concerned about the obstacle array facing his First Infantry Division. The division itself spent more than a month rehearsing breaching operations.

⁹⁶ Demilitarization for Democracy, 3-4.

⁹⁷ US Army Concepts Analysis Agency, *Comments on "Exploding the Land mine Myth in Korea"* (Received by FAX on 9 March 1998 from LTC Spinelli, DA DCSOPS, undated).

⁹⁸ Senator Patrick Leahy, "Utility Isn't the Point in Ban on Land Mines," *New York Times* (4 April, 1996), 24.

⁹⁹ Paul A.S. Jefferson, "A Political Minefield," *The Wall Street Journal* (15 October, 1997). Mr. Jefferson is a former bomb disposal officer in the British Army who was severely injured by a landmine in Kuwait. Since leaving the military, he has been involved with humanitarian mine removal. He describes himself as "typical of most mine clearers" in that he does not believe a ban will do anything to solve the humanitarian problem. It makes the activists feel good about themselves, but it does nothing for (and in fact may detract from) the real humanitarian mission -- demining operations.

¹⁰⁰ President Clinton, Presidential Address of 17 September 1997, *US Leads in Land Mine Removals While Others Talk* (January 1998) [WWW document]. URL <http://www.defenselink.mil/pubs/di97/di1247.html>. According to the president's address, the US has led in the area of demining assistance, having contributed more than \$150 million, and having removed landmines in 15 beleaguered nations.

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